AMENDMENTS TO THE DRAWINGS

Applicant submits concurrently herewith one sheet of annotated drawings illustrating Figs. 1-3 showing changes in red ink, accompanied by one sheet of formal replacement drawings illustrating Figs. 1-3 incorporating such changes.

Attachments: Replacement Sheet (1)
Annotated Sheet Showing Changes (1)

REMARKS/ARGUMENTS

Reconsideration of this application is respectfully requested.

The missing period at the end of claim 7 has been added by the above amendment.

The above amendments also reflect an attempt to correct minor errors and to place the entire application in more traditional U.S. format.

In addition, the limitations of claim 10 have been incorporated into claim 1, and claim 10 has been cancelled.

The rejection of claims 1-10 under 35 U.S.C. §101 as allegedly directed to non-statutory subject matter is respectfully traversed.

As made clear in applicant's specification, the matched filtering process involves the filtering of an input time domain signal representing a physical characteristic of a tangible thing. See, for example, the very first paragraph of the specification giving numerous examples of matched filtering applications in the real physical world of telecommunications line testing, optical domain reflectometry, RADAR, SONAR, magnetic recording channel characterization and spectroscopy. In addition, claim 1 has been amended so as to now include steps of actually receiving an input time domain signal representing a physical characteristic of a tangible thing, sampling same at certain

sampling intervals, using apparatus to compute various Fourier transforms and products and, finally, to convert the filtered frequency domain product to an output time domain signal representing a filtered version of the input time domain signal, now transformed to provide a more useful representation of the physical characteristic of the tangible thing.

Especially as now claimed, the invention as recited does indeed have a real world value and practical application which makes the result useful, concrete and tangible. Conforming changes have also been made to at least some of the dependent claims.

The rejection of claims 1-10 under 35 U.S.C. §102 as allegedly anticipated by Budisin is also respectfully traversed.

Claim 1 requires matched filtering of a sampled signal where synchronism does not exist between the incoming signal and the reference sequence that defines the matched filtering process. This can be of value in circumstances such as those discussed in applicant's specification on page 3, lines 15-19, where a signal, originally generated at a sampling rate $1/\lambda$, is received and sampled at $1/\tau$, and is then to be subjected to matched filtering in accordance with its original form, i.e., a sequence at intervals $1/\lambda$. It is not possible to perform such a filtering process using time-domain techniques as this would involve the construction of a filter with delays equal to a non-integer number of samples.

The invention employs a Fourier transform technique. This is known *per se*, for example, from Budisin. However, as far as the applicant is aware, it has not previously been proposed to apply it to the situation set out in the claims where the sampling is not synchronized to the sample period of the reference sequence.

The invention also, recognizing that the necessary calculations of the transforms can be carried out in advance only if both τ and λ are known in advance, facilitates more rapid calculation in real time by means of the expedients set out in the last few lines of claim 1 (i.e., the "wherein" elements).

Budisin discloses a method of matched filtering in accordance with a reference sequence which is a Golay sequence. It is clear from Fig. 1 of Budisin that this is a time-domain filter, not a frequency domain filter as claimed. The Z-transform notation is used by Budisin to describe the behavior of these time domain filters. This usage is very common, and does not constitute a suggestion that these transforms actually be calculated in reality. It is a mere convenience of description. It follows that Budisin fails to disclose the computation of a transform or, of course, of doing so iteratively as claimed.

It is true that on page 220, 5th paragraph, Budisin mentions an FFT algorithm. This, however, appears merely to be a reference to a conventional FFT correlator, not a

suggestion that the techniques discussed in Budisin might be applied in the context of an FFT-based system.

There is no disclosure in Budisin of the possibility of asynchronism between the signal to be filtered and the reference sequence as claimed. Indeed, as discussed above, the time-domain filter of Budisin is inherently incapable of such operation.

It is also noted that since Budisin deals with a time domain filter and mentions the frequency-domain filter only in passing, and does not mention or hint at the asynchronous operation that is central to the claimed invention, Budisin does not even begin to indicate or suggest the use of the frequency domain filter as a solution to the problem of asynchronous operation is other than non-obvious. Furthermore, Budisin does not point towards the use of iterative combination of transforms of shorter sequences.

Given such fundamental deficiencies of Budisin with respect to amended claim 1, it is not believed necessary at this time to discuss additional deficiencies of this reference to respect to other aspects of the rejected claims. Suffice it to note that, as a matter of law, it is impossible for a reference to anticipate any claim unless it teaches each and every feature of that claim.

The Examiner's attention is also drawn to new apparatus claims 11-19, which will be seen to parallel method claims 1-9, respectively, discussed above. Accordingly, these apparatus claims are also believed to be allowable.

Accordingly, this entire application is now believed to be in allowable condition, and a formal notice to that effect is earnestly solicited.

Respectfully submitted,

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